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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/991,781
Filing Date: November 26, 2001
Appellant(s): STIESDAL ET AL.

James C. Wray and Meera P. Narasimhan
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed April 16, 2004.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

The Appellants' statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Invention

The summary of invention contained in the brief is correct. In order to quickly direct attention to the features of the invention, the examiner notes that figures 6-9 and 11 pertain to the invention, while figures 1-5 and 10 are directed to prior art.

(6) Issues

The Appellants' statement of the issues in the brief is correct.

The rejection of claims 14-15 and 17-18 under 35 U.S.C. 103(a) as being unpatentable over Dassen 5,533,865 in view of Crook 1,724,456 is withdrawn, in light of Appellants' arguments in the Appeal Brief, page 10, lines 16-23 and page 11, lines 1-12.

The rejection of claims 16 and 19-20 under 35 U.S.C. 103(a) as being unpatentable over Dassen 5,533,865 and Crook 1,724,456 as applied to claims 14 and 17 above, and further in view of Vijgen 5,088,665 is withdrawn, in light of Appellants' arguments in the Appeal Brief, page 10, lines 16-23 and page 11, lines 1-12.

The rejection of claims 17-20 under 35 USC 103 (a) is withdrawn, because after further careful consideration, claim 17, lines 4-5 recites "means for connecting the serrated panel to a trailing edge on each of the wind turbine rotor blades of the wind turbine rotor", which invokes 35 USC 112, sixth paragraph. Appellants' specification (page 10, lines 4-8) states that the serrated panels are mounted with double-adhesive tapes on the blades. None of the prior art of record discloses that the means for connecting the serrated panel to a trailing edge on the wind turbine rotor blades is in the form of double-adhesive tapes, or equivalents thereof. Claims 17-20 are allowable over the prior art of record.

Therefore, the only remaining issues stated by Appellant are:

(3) Whether claims 14-15 are unpatentable under 35 U.S.C. 103(a) as being unpatentable over German Patent 311,416 in view of Dassen 5,533,865.

(4) Whether claim 16 is unpatentable under 35 U.S.C. 103(a) as being unpatentable over German Patent 311,416 in view of Dassen 5,533,865 as applied to claim 14 above, and further in view of Vijgen 5,088,665.

(7) Grouping of Claims

Appellants' brief includes a statement that claims 14-20 do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

311,416	Germany	5-1919
5,533,865	Dassen et al.	7-1996
5,088,665	Vijgen et al.	2-1992

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over German Patent 311,416 in view of Dassen 5,533,865. The German Patent 311,416 (figures 1, 3-4, and 6-

7) discloses a method and apparatus for improving the efficiency of a wind turbine u whereby the rotor blades a, a' are furnished with serrated trailing edges b, b' with plural span-wise, periodic indentations, with the serrations extending from the trailing edge into the airflow behind the trailing edge. The serrations are provided over a spanwise extent of the trailing edge having a length of about 100 percent of the radius of the blade. As shown in figures 1 and 3, the serrations a'c' are provided at an angle different from 0 degrees relative to a chord of the blade. A serrated panel b, b' may be fixed to the rear edge of the blade. One of ordinary skill in the art would readily recognize that the serrated trailing edges disclosed by the German Patent improve the lift and drag, which inherently improves the efficiency of the wind turbine. The German Patent 311,416 also inherently increases efficiency because the serrated trailing edges are similar in nature to those disclosed by Applicants and inherently possess the same efficiency-increasing properties. As shown in figure 1, the angle of the serrated part/panel changes passively in response to the speed and angle of the airflow at the trailing edge due to the flexing of the serrations or serrated panel, shown flexibly moving from position ac to position a'c'. However, the German Patent does not disclose that the serrations are provided as a retrofitted panel of an existing wind turbine.

Dassen (figure 2 and column 2, lines 2-3) shows a wind turbine having rotor blades 3-5 that are furnished with serrated trailing edges 6-11, 22-24 with plural span-wise, periodic indentations, with the serrations being provided as a retrofit of an existing wind turbine rotor by attachment of a serrated panel 7 (figure 2), for the purpose of reducing noise and inherently

increasing efficiency by providing a readily attachable serrated panel at the trailing edges of the blades.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the wind turbine of the German Patent 311,416 such that the serrations are provided as a retrofitted panel of an existing wind turbine, as taught by Dassen, for the purpose of reducing noise and inherently increasing efficiency by providing a readily attachable serrated panel at the trailing edges of the blades.

Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over German Patent 311,416 and Dassen 5,533,865 as applied to claim 14 above, and further in view of Vijgen 5,088,665. The modified wind turbine rotor of German Patent 311,416 shows all of the claimed subject matter except for the sawteeth having approximately 60 degrees included angles between adjacent vertices.

Vijgen (figures 2, 3, and 13, for example) shows an airfoil 20 having a trailing edge 24 with a serrated panel 30 having plural spanwise periodic indentations in the form of sawteeth, having an included angle of 60 degrees, for the purpose of improving lift and drag.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified wind turbine of German Patent 311,416 such that the sawteeth have approximately 60 degrees included angles between adjacent vertices, as taught

by Vijgen, for the purpose of improving lift and drag. In column 3, lines 32-37, Vijgen teaches that the principles of the invention may be applied to any aerodynamic lifting surface with sharp or moderately blunt trailing edges such as propeller blades or fan blades. Therefore, because the wind turbine of Dassen includes an aerodynamic lifting surface with sharp trailing edges, it would have been obvious to one of ordinary skill in the art to apply the teachings of Vijgen to the wind turbine blades of Dassen.

(11) Response to Argument

With regard to Appellants' arguments on page 24, first three paragraphs that German Patent 311,416 has nothing related to an improvement of efficiency by making use of a serrated trailing edge as uniquely defined in the present application, and that the elastic plates are incorporated to make use of turbulent movements in the air, the examiner disagrees with these arguments. As set forth in the first Office action and the final rejection, one of ordinary skill in the art would readily recognize that the serrated trailing edges disclosed by the German Patent improve the lift and drag, which inherently improves the efficiency of the wind turbine. Because the serrated trailing edges b, b' thereof are similar in nature to those disclosed by Appellants, the German Patent serrated blades inherently increases efficiency. The fact that Appellants have recognized inherent properties of the German Patent 311,416 does not render the claims patentable. Anticipation (although the issue here is obviousness) by a prior art reference does not require the recognition of inherent properties that may be possessed by the prior art reference. See *Verdegaal Bros. Inc. v. Union Oil Co.*, 814 F.2d 628, 633, 2USPQ2d 1051, 1054 (Fed. Cir.), cert. denied, 484 US 827 (1987). Concerning Appellants' argument that the

examiner "alleges that a person of ordinary skill in the art would recognize that the serrated trailing edges would improve the life (sic) and drag, even though the reference itself does not describe, teach nor suggest the claimed invention", the examiner notes that it is commonly known in the art of aerodynamics that flaps, rudders, and other similar discontinuities at the trailing edges of airfoils improve lift and drag. Appellants own specification (page 2, lines 18-24-26) states "Serrated trailing edges are known to improve the lift and drag characteristics of a lifting surface. Various embodiments are described in US Patent 5,088,665." US Patent 5,088,665 (column 2, lines 5-7) states that serrations provided at the trailing edge of an airfoil improves the lift and drag.

With regard to Appellants' arguments on page 24, third paragraph that none of the documents contain explanation relating to efficiency in the meaning of electrical power output as a function of wind speed and that none of the documents are relevant when evaluating patentability of the present invention, the examiner disagrees. Claim 14 does not contain any limitations directed to electrical power output as a function of wind speed. Claim 14 only recites "A method for improving efficiency of a wind turbine rotor" (line 1). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Again, because the serrated trailing edges of the German Patent are similar in nature to those disclosed by Appellants, the German Patent serrated blades inherently increases efficiency. The fact that Applicants have recognized inherent properties of the German Patent 311,416 does not render the claims patentable. Anticipation (although the issue here is obviousness) by a prior art

reference does not require the recognition of inherent properties that may be possessed by the prior art reference.

Appellants have argued that there is no motivation to combine the teachings of German Patent 311,416 and Dassen, because the examiner relies on Dassen as teaching an improvement in efficiency of a wind turbine, which is an incorrect reading, because Dassen states that the wind turbine is intended to reduce noise, while contrary to that, the present application provides a device that has optimal performance efficiency as displayed in the electrical power output from the wind turbine as a function of the wind speed, and that nothing in Dassen provides a basis for the assumption that improvement of efficiency is an inherent characteristic of noise reduction. The examiner disagrees with these arguments. As set forth in the first Office action and the final rejection, by virtue of the fact that Dassen reduces noise, Dassen concurrently increases efficiency. Reduction of noise reduces energy that otherwise would be expended in operation of the wind turbine blades in terms of losses. As set forth above, claim 14 does not recite electrical power output from the wind turbine as a function of the wind speed, but only broadly recites "A method for improving efficiency of a wind turbine rotor" (line 1). Because Dassen reduces noise and thus energy that otherwise would be expended in operation of the wind turbine blades in terms of losses, Dassen inherently improves efficiency. Claim 14 has been given its broadest reasonable interpretation in accordance with MPEP 2106: "Office personnel are to give claims their broadest reasonable interpretation in light of the supporting disclosure. *In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027-28 (Fed. Cir. 1997). Limitations appearing in the specification but not recited in the claim are not read into the claim. *In re Prater*, 415 F.2d 1393,

1404-05, 162 USPQ 541, 550-551 (CCPA 1969). See also *In re Zletz*, 893 F.2d 319, 321-22, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989)."

With regard to Appellants' argument that the prior art does not suggest the desirability of making the modification (page 25, fifth paragraph), the examiner disagrees. Column 1, lines 65-67 and column 2, lines 1-4 of Dassen state "When use is made of blades of curved cross section it is desirable for achieving the greatest noise reduction that the imaginary plane of the teeth according to the embodiment of Fig. 2 lies in the line of the curved plane acting as suction side. To implement this a saw tooth-shaped strip 7 can be used which is fixed in suitable manner to the rear edge of the blade." It is the examiner's position that this is an explicit teaching which provides motivation for the combination of German Patent 311,416 and Dassen. With regard to Appellants' citation of *In re Gordon* where the court found a proposed modification inappropriate as to obviousness because the modification rendered the prior art reference inoperable for its intended purpose, this argument lacks persuasiveness, because none of the proposed modifications of German Patent 311,416 render the German Patent inoperable.

With regard to Appellants' argument that a prior art reference must disclose each and every limitation of the claimed invention and must have described the invention sufficiently to place it in possession of one of ordinary skill in the field of the invention (page 25, last paragraph and page 26, first paragraph), the examiner's position is that both the German Patent 311,416 and Dassen inherently increase efficiency. Because the serrated trailing edges b, b' of the German Patent 311,416 are similar in nature to those disclosed by Applicants, the German Patent serrated

blades inherently increases efficiency. The fact that Appellants have recognized inherent properties of the German Patent 311,416 does not render the claims patentable. Anticipation (although the issue here is obviousness) by a prior art reference does not require the recognition of inherent properties that may be possessed by the prior art reference. Dassen inherently increases efficiency for the reasons set forth above.

With regard to Appellants' argument that the examiner stated that "a person of ordinary skill in the art would readily recognize that the serrated trailing edges improve that life [sic] and drag", but has not provided outside evidence or pointed to any explanation given in Dassen, and that in Dassen, there is no hint or any direction to literature that supports that the skilled man should realize a trailing edge improves lift and drag, the examiner disagrees. As set forth in the first Office action and the final rejection, it is commonly known in the art of aerodynamics that flaps, rudders, and other similar discontinuities at the trailing edges of airfoils improve lift and drag. Appellants own specification (page 2, lines 18-24-26) states "Serrated trailing edges are known to improve the lift and drag characteristics of a lifting surface. Various embodiments are described in US Patent 5,088,665."

With regard to Appellants' argument (page 26, last paragraph) that the prior art contains conflicting references and that the degree to which one reference must discredit another must be considered, the examiner does not consider German Patent 311,416 or Dassen to be conflicting references. Both German Patent 311,416 and Dassen pertain to wind turbines, and both pertain

to serrations provided on the trailing edges of wind turbine blades. The examiner does not see any conflicting teachings in these references.

With regard to Appellants' argument that the claimed invention is being used as an instruction manual or a template to piece together the prior art teachings to render the claimed invention obvious and one cannot use hindsight reconstruction to pick and choose among isolated disclosures to deprecate the claimed invention (page 27, first paragraph), the examiner's position is that the prior art has not been used to piece together the German Patent 311,416 and Dassen and hindsight reconstruction has not been used. Dassen is merely relied upon to teach that the serrations are provided as a retrofitted panel of an existing wind turbine. In response to Appellants' argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). Because the only knowledge taken into account was the teaching of Dassen that serrations are provided as a retrofitted panel of an existing wind turbine, which was within the level of ordinary skill at the time the claimed invention was made, and did not include knowledge gleaned only from the applicant's disclosure, it is respectfully submitted that such reconstruction is proper.

With regard Appellants' argument that the prior art must suggest the desirability of making a modification (page 27, third paragraph), it is the examiner' position that Dassen contains explicit motivation for making the proposed combination. Column 1, lines 65-67 and column 2, lines 1-4 of Dassen state "When use is made of blades of curved cross section it is desirable for achieving the greatest noise reduction that the imaginary plane of the teeth according to the embodiment of Fig. 2 lies in the line of the curved plane acting as suction side. To implement this a saw tooth-shaped strip 7 can be used which is fixed in suitable manner to the rear edge of the blade." With regard to Appellants' argument that there is no suggestion of using the elements of the prior art in substantially the same manner as appellants use them (page 27, fourth paragraph), it is the examiner's position that the modified wind turbine of the German Patent 311,416 and Dassen are used in exactly the same manner as Appellants use the claimed invention, and that this argument therefore lacks persuasiveness.

With regard to Appellants' arguments relating to the rejection of claim 15 under 35 USC 103(a) as being unpatentable over German Patent 311,416 in view of Dassen, that there would be no incentive to combine the German Patent and Dassen to arrive at serrations on each blade over a spanwise extent of the trailing edge of the blade having a length of between about 30 and 100 percent of a radius of the blade, in combination with serrated edges that provide for improved power output, life, drag, and efficiency as a function of wind speed and windmill blades, and that nothing in the references teach, suggest, or motivate one skilled in the art to combine the references in the manner proposed by the examiner, the examiner disagrees for all of the reasons set forth above. Additionally, the primary reference to the German Patent already shows that the

serrations are provided over a spanwise extent of the trailing edge having a length of about 100 percent of the radius of the blade.

With regard to Appellants' argument relating to the rejection of claim 16 under 35 USC 103(a) as being unpatentable over German Patent 311,416 and view of Dassen as applied to claim 14 above, and further in view of Vijgen 5,088,665, that Vijgen does not mention the possibility of improving efficiency in the meaning of electrical power output from the windmill turbine at any given speed, the examiner's position is that this argument is non-persuasive. Claim 16 does not contain any limitations directed to electrical power output as a function of wind speed. Claim 16 only recites "A method for improving efficiency of a wind turbine rotor" (line 1). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Appellants' argument that nothing in German Patent 311,416, Dassen, or Vijgen describes, teaches, or suggests all elements of the claimed invention and that there is no incentive to combine these references to create serrations on each blade as saw-toothed serrations having approximately 60 degrees included angles between adjacent vertices in combination with serrated edges for improved power output, life, drag, and efficiency as a function of wind speed and windmill blades (page 34, last paragraph and page 35, first paragraph) and Appellants' argument that the prior art does not suggest the desirability of making a modification (page 35, fifth paragraph) are not persuasive. It is the examiner' position Vijgen (column 1, lines 32-37)

provides explicit motivation for the combination of references: "... the principles apply to any aerodynamic or hydrodynamic lifting surface with sharp or moderately blunt trailing edges, such as wing, empennage, flap, propeller blade, fan blade, etc." Vijgen (column 3, lines 44-47) states that the serrated panel forms serrations 34 of a saw-tooth configuration with the included angle between adjacent teeth being preferably 60 degrees. Vijgen (column 2, lines 5-7) states that an object of the invention is to improve the lift and drag of the aerodynamic lifting surface.

With regard to Appellants' argument that there is no suggestion of using the elements of the prior art in substantially the same manner as appellants use them (page 35, third paragraph), it is the examiner's position that the modified wind turbine of the German Patent 311,416 which utilizes the teachings of Dassen and Vijgen is used in exactly the same manner as Appellants use the claimed invention, and that this argument therefore lacks persuasiveness. With regard to Appellants' citation of *In re Gordon* where the court found a proposed modification inappropriate as to obviousness because the modification rendered the prior art reference inoperable for its intended purpose, this argument lacks persuasiveness, because none of the proposed modifications of German Patent 311,416 render the German Patent inoperable.

For the above reasons, it is believed that a *prima facie* case of obviousness has been established and the rejections should be sustained.

Respectfully submitted,

C.V.
June 7, 2004

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